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ABSTRACT

This paper introduces the essential concepts underlying management information systems (MIS) from the managerial perspective, then outlines a form of MIS design and implementation that may be attainable in a Caribbean educational setting. The growing importance of information and the increasing need to amass thorough information for decision making are noted first. The paper then proposes using MIS to improve accountability, with the goal of improving the administrator's ability to defend budgets and demand autonomy. The capabilities of simple data banks and more advanced systems are discussed next, with particular reference to the needs of educational administrators. The vital role of top management in supporting the implementation and acceptance of MIS is asserted in the next section of the document. The paper then goes on to stress the need for adequate MIS management and to list the basic functions of the MIS within individual institutions. The paper concludes by noting the likelihood that MIS will only increase in value and complexity. Appendixes show kinds of information that systems can make available and detail vital steps in MIS implementation. (PGD)

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MANAGEMENT INFORMATION SYSTEMS AS A TOOL FOR EDUCATIONAL ADMINISTRATORS IN THE COMMONWEALTH CARIBBEAN

by

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Introduction

The general purpose of this symposium is to explore issues related to the professional preparation and development of educational administrators in developing areas generally and in the Commonwealth Caribbean in particular.

The issue that I wish to address is the development and use of management information systems as a tool for educational administrators. The purpose of the present paper is to provide some insight into the primary concepts of management information systems from a managerial perspective. This paper reflects this perspective and recognizes the contribution of MIS as a means rather than solely as an end.

The writer has travelled extensively in the Caribbean during the past 10 years and through a combination of formal and informal discussions, I have gained considerable insight into the problems facing educational administrators in developing countries. Clearly, this author recognizes that the realities of being a school administrator on a small Caribbean island are quite different from the realities of being a school administrator in Winnipeg, New York or London.

However, my casual observations have led me to the conclusion that educational administrators in the Caribbean can benefit from and in fact, need some form of MIS if they are to be prepared to meet the challenges and opportunities of the future.

The purpose of this paper is also to outline a form of MIS design and implementation that the author envisions as being attainable in a Caribbean educational setting.

The Information Society

One would have to be very much cut off from the world not to have heard that we in the developed countries are caught up in the information revolution. We have been told again and again that, because a new age is bursting upon us, we had better adjust to conditions of living that are radically different from those of the past. The message has more immediacy to those whose work has been changed by the latest wave of technology than to others to whom the world looks much the same as it did 20 years ago.

It is this author's opinion that this information revolution is having its largest impact on the field of Education and those of you who are involved in education in developing countries face a major challenge in this respect.

There can be no doubt about the speed-up. A paper published by the Science Council of Canada in 1982 says that the pace of technological advance in the past few years has only been matched by its absorption into the marketplace at a rate seven to ten times faster than previous technology. Nor can we discount the magnitude of the change: the same paper notes that since 1968, the power of computers has increased 10,000 times while the price of each unit of performance has decreased 100,000 times. Stanford University economist

Edward Steinmuller says that if the airlines had changed as much as computer-related technology, an airplane would now be carrying half a million passengers at 20 million miles an hour at less than a cent apiece.

When most people hear the word "information", they are inclined to think of television news and documentary programs. The fact that we are the best-informed--or at least the most massively-informed--society in history is an important feature of the information age. But the prophets of this age have much more than public information in mind when they say that our lives are coming to be ruled by information. It might be basically defined as "something told," and telling things to one another has become one of the leading preoccupations of a modern economy.

More people will work with information, fewer with goods

Because more and more information is being produced, it is taking up more and more of the energies of the society. A study done by Shirley Serafini and Michel Andrieu for the Canadian Federal Department of Communications in 1980 found that information workers then comprised at least 40 per cent of the Canadian labour force, compared with 29 per cent in 1951. They included as information workers all those who produce it (such as engineers and surveyors), process it (such as clerks and managers), distribute it (such as teachers and journalists), and run the technical system (such as machine operators and printers).

According to management sage Peter Drucker, information has become "the central capital, the cost centre, and the central resource of the economy". With the fading of the industrial age, in which most workers were concerned with producing goods, the number of information workers is bound to rise in inverse proportion to the number of workers directly engaged in goods production.

However, because the machines give the impression of "thinking" at stunning speeds, there is temptation to confuse the information they contain with knowledge. "Where is the knowledge we have lost in information?" T.S. Eliot wrote many years before the computer ever entered the scene. The answer is that information only becomes knowledge when it is sorted out, organized into a conclusion and checked for accuracy. (Royal Bank Newsletter, April 1985).

Much of the so-called information in computers is false, biased, incomplete or garbled. An over-reliance on computerized information helps to explain some of the classic blunders in budgeting and decision-making that so often make the news. The facts and figures in the machine must be subjected to the cool scrutiny of human logic and experience. When using them, we should keep in mind the occupational slogan of computer specialists: "Garbage in, garbage out."

We should never make the mistake of believing that these machines can do our thinking for us. Despite all the talk about "smart" computers, they do not have intelligence because they do not have ideas. Rather, they are aids to human thought which can take on repetitive, laborious and time-consuming mental tasks while men and women are left free to use their minds to do what they do most

usefully. The magic of the mind lies in its imaginative side--its intuition, originality and individuality. Machines do not have these qualities. They do not have the faculty of synthesizing facts and knowledge into that precious thing called wisdom. They have no critical instincts. They cannot exercise judgment. They cannot come together in discussions to produce intellectual results that are greater than each party to the discussion could achieve alone.

What they can do is provide the undigested raw materials of intellectual endeavour in a quick and convenient fashion. In the process, they are capable of helping us greatly in our striving towards the highest aspirations of mankind. The accessibility of these raw materials can help make our society more democratic and fair by giving everybody more of a voice in decision-making.

If you as educators want to have more of a voice in decision making and want to influence the decisions that affect your role as educational administrators, you will require more information and you will require it in a quick and convenient fashion and this is where a management information system can become one of your most effective tools.

Education as a Business

Throughout this presentation, you will find me making reference to business situations and terminology. I also use the terms educators and managers coterminously. I do that for a purpose because, in my judgment, education is a business and certainly, it is big business if one looks at the percentage of total Government spending that goes towards education. In my home Province of Manitoba 18 per cent of the total budget is allocated for education. Some people take exception when I make a business case for education, but I see nothing wrong with that. In fact, I think the sooner educators start putting forth business-like arguments to their political masters and using euphemisms like "bottom line," "cost benefit analysis," "multi year plan," etc. the sooner they will enhance their chances of ensuring they get their fair share of the budget. Earlier this year when I was in Barbados, I had the opportunity to discuss education matters with your late Prime Minister, the Honourable Tom Adams. One of the topics he was particularly interested in was management information systems. He expressed the view that more and more Governments need more information upon which to make decisions. He offered another very interesting viewpoint with respect to MIS that I think is pertinent to this discussion. He put forth the case for increased autonomy in the educational field. He saw this as being a necessary step particularly if we want to further the development of education leaders--Principals, Directors, Presidents as educational administrators. However, he cautioned that with increased autonomy comes increased accountability and that is where MIS can make a strong contribution. It provides the information, the monitoring vehicles for Chief Education Officers, Deputy Ministers and even Ministers so that they need only review summary information to ensure that accountability is maintained. Therefore, it seems to me that if you have no other motivation to embark on an MIS program, the chance to achieve greater autonomy is in itself a significant reward.

The Benefits of MIS within a Government Environment

As Governments face increasing demands on diminishing resources it is apparent that Government leaders want to allocate these resources into program areas where they can get the biggest payback. This indicates that individual departments within a Government are competing for these resources and, as many of you know, each year the competition becomes more intense.

In my view and experience, MIS is one of the best tools you can use in the pursuit of increased resources for your Department. MIS allows you to show how you have used your resources. You can argue your case on the basis on cost benefit analysis and you can do so on a confident basis. My experience has been that politicians respond to a well-documented presentation which indicates what you have done with the money allocated to you previously and what you intend to do with your requested level of funding. In modern day terms, it is referred to as return on investment. I can say without hesitation that the Colleges in Manitoba have benefited greatly from their use of MIS as a component of their budgetary presentation.

MIS in Perspective

While there have been many articles carried in business periodicals on the subject of Management Informations Systems, "MIS" is a phrase that is much misunderstood. In most institutions, it refers to the maintenance, either manually or by machine, of simple data banks. Simple data banks are filled with information about students, courses, faculty, finances and physical space. The adjective "simple" is misleading, however. For a data bank to be usable, a number of vexing problems must be solved, even if a bank is to be used in a single institution: first, definitions must be standardized so that all institutions collect data that is compatible with data from other institutions. Second, the data must be traceable for subsequent verification. Third, information must be condensed and focused so that the results have meaning and can truly clarify a problem or illuminate a solution. And fourth, the assumption behind the data must be explicit and clearly understood. (Mayhew)

Efficient and convenient comprehensive information systems, long kept from coming into being by a variety of obstacles, are now made possible by the concept of distributive processing and the technology of micro and mini-computer networks. Such systems can individualize instruction, group students efficiently, cut administrative costs, streamline program evaluation, support policy-making and foster more and better educational and psychological research. Abuses are also possible, including invasion of privacy, overreliance on data at the expense of reasoning or prompt action and overemphasis of education's scientific aspects. Nonetheless, as school populations grow and diversify and schools emphasize skills more and values less, education must become more systematized. Today, growing professionalism in administration, research and evaluation and improved organizational and educational theory facilitate scientific decision-making. Finally, recognizing that organizational decisions must relate to individual needs, we can use computers to improve learning and school operations.

A well-designed data system, for which information has been carefully collected and verified, can be of enormous help, even if it just provides straight answers to such questions as enrollments by course and the percentage of use of instructional space. It can be especially useful in providing for a variety of ratios that reveal the institution's situation. Appendix I provides a listing of ratios which, over time, can tell a good deal about the health of the institution.

Successful information sub-systems have been developed and used for such things as: student background and characteristics, academic performance, attendance and behavior; student and school instructional and support programs; school and district personnel, business and financial systems; etc. Gradually, through a combination of commitment and technological advances, we have been able to weld these sub-systems together into the beginnings of the comprehensive information systems we have long envisioned.

It is entirely possible that simple data systems may be all many institutions need, to find out about themselves, and to suggest directions for decisions. There are, however, more advanced management information systems that allow for simulation of the likely behavior of an institution under a variety of conditions. These not only show where an institution is but also what will likely happen under each of several eventualities.

Simulation systems are seen to have several distinct advantages. They force users to pay attention to interactions within an institution. They allow study of a wide variety of alternatives and help alleviate uncertainty by showing what will likely happen if certain events take place.

It is this author's opinion that most islands in the Caribbean can benefit from a Management Information System, but caution needs to be exercised when selecting and designing a system. It is better to start small and add components as time goes on rather than overbuild and create a system that takes more time and resources to support than is warranted by the educational system it is intended to serve.

The Role of Top Management

I would now like to address what I believe is one of the most important, if not in fact the single most important, ingredient for a MIS project. In order for a Management Information System to be successfully implemented, there needs to be a high level of commitment from the senior levels of the organization. Unless there is commitment from the Chief Executive Officer, the Deputy Minister, the Chief Education Officer and the Director, the President or Principal of the various institutions, your MIS project will not succeed. The people you assign to implement this project will be frustrated and confused.

There will also be conflict within your institutions and educational system because, unless the support and commitment of top management is clearly stated and permeated through the entire organization, people who, for whatever reason, fear MIS will throw obstacles in the way of those responsible for gathering

information and developing systems. We all know people who have a passive or creeping commitment to change. They don't want the status quo to be altered. I've often said about some people and their reluctance to support MIS is that they would sooner live with a problem that they can't solve than a solution they don't understand. When I was implementing Manitoba's MIS system, I was amazed at the attitude of some people who held very responsible positions in our institutions. "Why do we need MIS"--"Before I give you enrollment information, I want to know what you intend to use it for"--"Who wants to know how much it costs to offer my courses"--"I have all the student information I need in a big binder in my desk--if you want to know anything, just ask me." I could go on and give you more examples, but I hope the point is clear. In order for MIS to succeed, there has to be total commitment to cooperation throughout the entire organization and this can best be achieved by having the Chief Education Officers clearly articulate their commitment and their expectation that they expect all levels of the organization to give the MIS project their unqualified support.

One of management's most important responsibilities is to create a climate of support throughout the organization for the systems being undertaken and for the systems approach to management. Management must feel a genuine interest and indeed an excitement in the development of a MIS, or the key people in this important part of the business are likely to become discouraged. Similarly, they must demonstrate their interest and excitement for the project to the rest of the organization.

Resistance to Change

Probably there are more people who resist change for one reason or another when it is first introduced than there are those who accept it when it is first introduced. Resistance tends to focus on human relationships rather than on the structural and procedural changes in the systems themselves or the accompanying changes outside the systems. People resist change because it upsets their established pattern of behaviour. They often see it as a threat to their security.

These negative reactions can be shared by such diverse elements as the Department Head who sees his routine decisions programmed, the older long-time instructor who cannot adapt to the new technology, the relatively uneducated and unskilled worker whose background deters comprehension of abstract concepts and the student who is plagued by computer communications.

Erich Fromm, the noted psychologist, has stated:

> Computers should become a functional part of a life-oriented social system and not a cancer which begins to play havoc and eventually kills the system. Machines or computers must become means for ends which are determined by man's reason and will .... That is to say, man, not technique, must become the ultimate source of values; optimal human development and not maximal production the criterion for all planning.

Fortunately, not all change is resisted by all people. Some welcome change. It provides them with hope for adjustments in existing work situations, alterations in relationships that exist among their associates and opportunities to become more successful in time with their personal endeavor.

Therefore, in addition to the stated need for senior management commitment, which will help alleviate the uncertainties surrounding MIS, there is a need for an in-depth training program to ensure that all persons affected by the MIS fully understand the system and what it means to their daily lives.

There is increasing evidence that information system development and personnel development within an institution must not only be parallel in sophistication and noncontradictory in design, but also that concurrently developing programs are mutually supportive and increase the effectiveness of each far beyond the capability of either. Management Information System design, implementation, report format and use have become much more manager-oriented.

Managing the MIS

Today's educators must be prepared for successful working relationships with computerized information processing systems. They must understand and appreciate the broad impact computers have had, are having and can be expected to have on educators and the environment in which they work. The information technology can provide many benefits, but it can also present significant difficulties to managers who are not prepared to cope with the problems of organizing and controlling the information resource itself. How the organization deals with these problems (or fails to deal with them) will, in large measure, determine the success or failure of the MIS effort.

Some managers may even consider the computer an encroachment on and a threat to their traditional decision making rights. Perhaps they feel this way because the presence of decision-oriented information--specific facts and figures can force management to take information in distasteful situations which they are otherwise able to ignore. General knowledge does not trigger action but facts and figures cannot be continually ignored.

A manager must be able to separate the substance from the hype and if a manager is to use management information systems successfully he or she must be able to understand and measure the benefits--if you can measure it, you can manage it.

The administrative tasks in education are as complex and demanding as those in any business organization and, as in business, educators have much to gain from computerized assistance. Educational administrators are looking for ways to release both themselves and their teachers from routine clerical tasks and paper work in order to provide more time for instructional concerns. In addition, school administrators are seeking and using types of information never collected before, information which is now deemed necessary to make decisions concerning the efficient and effective operation of schools and divisions. In these regards, sufficient evidence exists to support the use of the computer

"when it is used for masses of data related to self-defined tasks, when processing is highly repetitive, when rules for decisions are specific, when processes are to be repeated many times under a variety of conditions, and when there is demand for speed." (Department of Computer Science, 1979, p. A1)(Marshall, 1982)

A point to remember is that a manager does not have to understand how a system works, only how to use it.

The Individual Institution and Management Information Systems

Although individual colleges and universities differ tremendously from each other in size, mission, complexity and philosophy, they are all somewhat similar administratively and share common information needs which conform to Anthony's (1965) and Sheehan's (1972)* three management function/activity/information levels: information for strategic planning (forecast reports), information for management control (analytic reports), and information for management control (analytic reports) and information for operational control (operating reports).

The first, or highest, level of the above hierarchy involves information which is used in developing sophisticated plans, policies, and in the formulation of strategic decisions, the results of which are of major consequence in determining the direction of the institution. The data at this level is quite often simulated into actual aspects of institutional operation which in essence focuses attention upon the interrelationship between the various facets of the collegial environment. These reports are aggregative in nature and are usually delivered to the presidents, deans, department chairmen, or directors on an irregular or, more specifically, on a need basis. Several examples of strategic planning concerns include: 1) future tuition increases, 2) acquiring new facilities, 3) enrolment forecasts, 4) initiating or deleting degree program, 5) changing organizational structure, 6) budgeting/financially allocating funds to the various colleges/departments and 7) examining and re-defining the institution's mission, philosophy and goals (Baldridge, 1971).

The second level, or that of management control, involves information which is used for the control of various administrative policies and decisions usually, but not always, relating to budgeting. This management control information appears far more regularly than the aforementioned strategic planning information and is delivered to upper- and middle-level administrators. Some examples of management control concerns include: 1) formulating line-item budgets, 2) promotion of student, 3) proper and consistent resource utilization, 4) changing curricula, 5) student enrolment patterns, 6) control of faculty and staff levels, 7) budget control and organizational inter-relationships, and 8) faculty/personnel evaluation (Millett, 1974).

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*Sheehan's three levels of reports are placed within the brackets.

The third, or lowest, level of informational need revolves around operational control. This level deals with the basic control of specific tasks being executed resulting in immediate, daily or periodic action. Though sometimes described as merely clerical in nature, operational control decisions are ones made by all and thus witness information being delivered to almost all personnel from the bottom-line supervisors to the top-line administrators. More explicitly, information for operational control is furnished to: 1) registrars --data for scheduling courses, student admissions, grades, and transcripts, degrees and graduation; 2) librarians--circulation, storage, cataloguing, and purchasing; 3) personnel managers--payroll, applicant data, updated personnel data, staff benefits, and regular assignment and scheduling of employees; 4) facilities managers--scheduling of buildings and rooms, article inventory of buildings and grounds; 5) department chairmen--faculty activity and workload information, class/course assignment; 6) research directors--records on proposals, grants, contracts, and current status of on-going research; 7) alumni and placement officers--job interviews, corporation openings, visitations, alumni gifts and donations, alumni achievements, positions and publications; 8) financial managers--expenditure accounting, budget accounting, depreciation accounting, student loans and student aid accounting; 9) auxiliary managers --food services, housing, physical plan, institutional research, maintenance, book store, transportation, and many, many others (Fresh, 1975; Levine, 1975; T.D.R. Martin, 1974; Shelton, 1975; Thomas, 1975).

Much work has been done in computerizing information systems at the operational controls level. Scarcely an institution exists today that does not computerize student records, payroll, library circulation, inventory, registration procedures and other operations level tasks. The end result in the computerization of such tasks is the tremendous increase in efficiency and cost-effectiveness of these operations. Likewise, computerization of information systems on the strategic planning level and the management control level eliminates time-wastage and clerical error and helps improve the administration of the institution by providing systematic, timely and relevant information quickly and efficiently for planning purposes and administrative decision-making (Baughman, 1969).

Throughout this paper, many references have been made to the various components that would comprise a typical MIS design. Management Information Systems are a successful reality at a vast and increasing number of educational institutions and certainly, the hardward and software systems are now available that will allow many Caribbean educational systems to undertake a successful MIS program. Time does not permit me to discuss any of these systems in sufficient detail, but I have made available an outline of a system which has recently been developed by the Control Data Canada Corporation. The system is referred to as EDEN. The system is characterized by its comprehensiveness and ease of operation.

Appendix "B" to this paper details the important steps that should be taken in order to ensure a successful MIS implementation regardless of which system is selected.

Conclusion

A Management Information system is little more than a specialized information storage and retrieval system. It is, in its most basic form, a collection of data stored in some organized fashion, along with a set of programs or procedures which are used to retrieve whatever useful information is requested from the stored data base, and another set of procedures or programs which treat the data in various ways once the data is retrieved. It must be remembered that, in this process, data is and will always be raw material, information will always be the end product. To this basic form is added procedures to periodically update or add to the stored data bank. Though this certainly is by no means a description of a highly computerized, sophisticated, simulation-capable management information system, it amply describes the very basic structure of the management information system and, in fact, the very first manual management information systems which existed not so very long ago (Knapp and Ogilvie, 1973).

As mentioned earlier in this paper, today's more sophisticated management information systems, in addition to the storage of a very broad data base, include numerous models and computerized programs which are capable of retrieving necessary information instantaneously, displaying this information in meaningful forms to the user, simulating actual aspects of a college or university operation, and treating the data in a number of ways as it would be hypothetically affected by a number of possible alternatives before the decision is actually made to go with any one of or the 'best' alternative (Levine & Mowbray, 1974). The ultimate objective of the management information system is to provide management with information so that sound decisions may be made and proper alternatives may be implemented.

Tomorrow's management information systems can be speculated upon as to design, appearance, speed and quantifiable features. Ted Cudnick in a paper prepared in 1977 dealing with higher education and MIS speculated that "Certainly one may foresee an audio-video mechanism on the desks of the institutional executives with instant display of well positioned information and accompanying audio discussion of alternatives with far-ranging simulated effects. Even as the administrator speaks or converses with his peers, the system senses his direction and responds with needed and crucial information and displays alternatives for decision-making purposes." "Should some of these advancements actually take place, they will result in alteration of hardware and software design."

Cudnick was certainly a prophet because earlier this year I had a telephone installed in my office known as an ENVOY Display phone wich is a type of mini-micro computer. It has a 6-inch square screen and a miniature keyboard built into the base of the phone. By simply punching in a couple of commands, I can call up current budget or cash flow information, or enrolment statistics which are stored on larger micros in my office or on a mainframe computer located at the University many miles away from my office. However, regardless of the technological advancements and the new executive toys that come into the market, the purpose of the management information system will remain for a long

while or, in fact, indefinitely. That is, the management information system will continue to allow the administration to make decisions on a more informed, more accurate basis. Obvious it is that no matter how sophisticated the system becomes, it will still remain the servant of man and not make the decision itself, but rather supply the needed information and thus allow man to make the soundest of decisions possible (Hammer, 1974).

It is with this in mind that higher education can continue to utilize such systems and support their continued development without fear of lost autonomy. Thus, the future of management information systems in higher education remains an exciting challenge because these projections should come about, but they can only be achieved through the continuing efforts of today's users.

Management information systems must continue to allow institutions their autonomy, their dignity, their freedom of philosophy and direction. The positive contributions must be continued and the progress must be enchanced for management information systems to be totally accepted by all in the world of academe. The responsibility for achieving all of this in the foreseeable future rests with today's users within higher education. With constant efforts on the part of all, management information systems can find their rightful place in the support of higher education for now and in the future.

1. Students

Number of new-student applications this year / Number of new-student applications last year

Number of accepted students / Number of applicants

Number of enrolled students / Number of accepted students

Number of enrolled students / Number of applicants

Full-time students / Part-time students

Number of graduating students / Number of students entering 2 or 4 years earlier

Number of graduates / Number of majors offered

Number of students / Number of majors offered

Number of students / Number of courses offered

2. Faculty

FTE students / FTE faculty

Full-time faculty / Part-time faculty

FTE faculty / Part-time faculty

Majors / FTE faculty

Courses / FTE faculty

Total course credit hours / FTE faculty

Total student credit hours / FTE faculty

Total student credit hours (Year N) / Total student credit hours (Year X)

APPENDIX I

3. Administration

$$\frac{\text{FTE students}}{\text{FTE administration}}$$

$$\frac{\text{FTE students}}{\text{FTE staff}}$$

$$\frac{\text{FTE faculty}}{\text{FTE administration}}$$

$$\frac{\text{FTE faculty}}{\text{FTE staff}}$$

4. Facilities

$$\frac{\text{Dormitory occupancy}}{\text{Dormitory capacity}}$$

$$\frac{\text{Total enrollment}}{\text{Number of classroom seats}}$$

$$\frac{\text{Total library volumes (year N)}}{\text{Total library volumes (year X)}}$$

APPENDIX II

DEFINE MANAGERS' NEEDS FIRST

Managers' information needs should determine the design of the system. Involving information users in the development of the system and integrating the information system with existing management processes can help to ensure responsiveness to managers' needs. Developing computer programs after managers' information needs are clearly defined will help to prevent computer technology from dominating the design of the system.

INVOLVE DATA PROVIDERS IN SYSTEM DEVELOPMENT

Data providers are much more likely to submit accurate and timely data if they view the system as responsive to their needs. Information needs of data providers will be considered if data providers are involved in system design. At the same time, they will recognize that they are receiving benefits for their efforts.

MINIMIZE DUPLICATION IN DATA COLLECTION

The ultimate objective should be to require data providers to supply each item of information only once to reduce the burden on their time and to minimize the chance for errors. Duplication can be minimized in several ways. Information already in the general education data bank can be used for the special education system. Universities or service agencies may have information special education managers need. Cross-referencing several sources of information can provide many different reports from a few unique pieces of data.

DESIGN SIMPLE DATA COLLECTION FORMS AND REPORTS

Data collection forms that are easy to complete make accurate and timely submission of data more likely. Managers will more likely use information provided by the system if it is presented in an understandable report. Therefore, data collection forms should be as self-explanatory as possible and system reports should be easy to understand.

PILOT THE SYSTEM

A pilot test of the system in one institution or major program area can bring out problems and needs experienced in actual use of the system. Changes can then be made more easily before full scale implementation takes place.

PHASE IN IMPLEMENTATION

Phasing in implementation allows data providers and users to adjust gradually to the system and the system can be revised more easily. For example, data collection, processing and reporting for students could be implemented before data about personnel and finance. By phasing in the system, managers also begin to receive information from the system at an earlier time.

BUILD A FLEXIBLE SYSTEM

The needs of special education administrators and managers will change over time. Changes may be as broad as new regulations or as specific as adding the names of a child's siblings. System designers should expect that some changes will be necessary. Procedures for identifying and implementing desired adjustments on an on-going basis should be an integral part of the total system.

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